The Veterinary Record

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 2. JANUARY 11, 1936. VOL. XVI.

General Articles

THE INCIDENCE OF TUBERCULOSIS IN A CATTLE REARING DISTRICT IN NORTH WALES*

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PART I

The increased interest in bovine tuberculosis, which has been so evident in recent years, has led to several attempts to estimate with some accuracy the incidence of tuberculosis in our cattle population. There is surprisingly little information of value in this connection, for no general attempt has been made to keep the records of herds being tested for the first time. The report of The People's League of Health gives figures obtained from various sources which lead the committee to state, as an essential conclusion: "It is estimated, on the basis of the tuberculin reaction, that at least 40 per cent. of the cows in this country are infected with the tubercle bacillus, though only a minority of them are in an actively infective condition." The Economic Advisory Council Committee on Cattle Diseases in its Report records that "A number of witnesses before us have expressed the view that 40 per cent. of the cattle in this country are infected with it (tuberculosis) in such a degree that they will react to the tuberculin test." It quotes results in the testing of 144 herds, not previously tested for tuberculosis, as showing 43 per cent. of reactors among the 5,199 cows and considers that, "In the light of such figures as these the generally accepted conclusion that at least 40 per cent. of cows in dairy herds are affected with tuberculosis does not appear exaggerated." Yet, in its "Summary of Principal Conclusions and Recommendations" the Report reads, "At least 40 per cent. of cows are infected with it (tuberculosis) in such degree that they will react to the tuberculin test."

There is a general tendency to assume that this figure, 40 per cent., is the index of the extent of tuberculosis among all the cattle classed as cows, even all the cattle, in this country; whereas the information on which it is based relates, almost entirely, to cows in herds maintained for the sale of milk.

It would seem that sufficient evidence has been obtained on which to estimate that approximately 40 per cent. of the *cows in our essentially dairy herds* would react to the tuberculin test. There is, however, little evidence to indicate the extent of tuberculosis among herds of beef-producing cattle, nor is there, apparently, any good evidence as to the extent of tuberculosis among herds kept in upland districts mainly for the rearing of stock. The writers, therefore, proposed to test a considerable number of herds of the latter type in the rearing districts in North Wales. For this work to have full significance it was essential that all, or almost all, the cattle in selected districts be included, selection being based solely on the area being a typical upland rearing district. Such a district was surveyed as to the number of cattle kept therein and the type of animal husbandry practised. Unfortunately, for certain reasons the survey of this district had to be abandoned and a district selected in which full co-operation was assured. The latter was not quite typical of the upland rearing areas of Wales in that there was some introduction of animals other than calves.

Although the writers hope to find the opportunity to continue this work on a sufficiently extensive scale, the results of their survey of this relatively small area seem of sufficient interest to justify their presentation now.

THE PRELIMINARY SURVEY

The selected district consists of two upland valleys which radiate from a common point about 344 ft. above sea level. Each valley is relatively narrow, the land on each side rising rapidly to over 700 ft., so that the area on which mature cattle can be grazed is restricted. A river runs through each valley and the larger of the two is traversed by a main road. Sheep farming is the main agricultural interest, with cattle raising almost as important and pigs and poultry general side-lines.

As in some of the upland rearing districts of North Wales there are quite a number of small holdings, not modern County Council holdings but what might well be described as "cottage holdings." The farm buildings are old and in no case had their construction been

* Paper presented at a meeting of the North Wales Division, N.V.M.A., held at Rhyl, November 29th, 1935.

improved. Shippons generally are poorly lit and have wooden partitions, often with a calf pen at one end. Where separate boxes have been provided for calf rearing they are commonly of "temporary" construction (wood and corrugated iron) with little window space and poor ventilation. Furthermore, there is a general tendency to carry a young horned stock much in excess of the capacity of the buildings. The majority have yards with an open fronted shed in which, from November until April, their yearlings and two-year-olds are housed except for a few hours grazing each day. None of the farms sell milk in any quantity, the great majority making a little butter. All purchase and rear calves in addition to those bred on the farm. In general, the introductions are quite young calves purchased mainly in Chester and Wrexham markets (large centres for the sale of calves from dairying herds) and young heifers and bullocks which, with a few exceptions, are bought in local sales.

The stock, of fair to good quality, was a mixture of cross-bred shorthorns and animals of the Welsh Black type. Their condition was good but on some farms the young stock was extensively affected with ringworm. Apart from an occasional outbreak of husk, there was no history or evidence of any endemic and none of the cattle, so far as their owners were aware, had been subjected to the tuberculin test.

At the time of the preliminary survey the writers had the very valuable assistance of the local practitioner, whose good offices undoubtedly smoothed certain difficulties. Each owner was asked to afford all the necessary help in controlling the animals and to allow every bovine over two months old to be tested. It was agreed that the results of the test be a matter of confidence between the writers and the owner but that the local practitioner be invited to attend on the occasion of the reading of the results. Unfortunately, pressure of work prevented the latter from attending on every occasion. It was further arranged that the writers should point out to the owner each animal which reacted but that no certificate would be issued in any case. Permission to publish these results has been obtained—the individual farms to be known by a letter and the area to remain unidentified.

It is greatly to the credit of the farmers concerned that, with two exceptions, they accepted these conditions and were most painstaking in their efforts to assist. Two owners refused permission to test. One of the farms, in Area *II*, carried about 12 cattle and the other, in Area *III*, about 20 head. With these exceptions all the cattle in the district were tested during March, 1935.

For convenience in testing, the district was divided into three areas. Area *I* consisted of the whole of the smaller valley; eight farms carrying 188 head of cattle over two months. Area *II* comprised those farms situated on the left side and Area *III* those on the right side of the larger valley. There were seven farms with 125 head of cattle in the former and five farms carrying 137 head in the latter. The whole district, for the purposes of this survey, contained 20 farms and 450 animals.

The Tuberculin Test

The double intradermal test was employed throughout, using synthetic medium tuberculin obtained from the Institute of Animal Pathology, Cambridge. Each animal was identified and its age and history noted, while the site for injection was prepared (close clipping of a relatively small patch on the side of the neck). Skin measurements were taken prior to injection, at the 48th and 72nd hour and the character of the swelling noted at each of the latter two visits. Among the reactors, the swelling was characteristic in the majority at the 48th hour and no second injection was made. The results were read by the writers either in conjunction or independently, much more reliance being placed on the nature of the swelling than on its measurement. In four instances difficulty in defining the nature of the swelling was encountered. It is of interest to note that all occurred in Area *I* and that on Farm E they occurred in mother and daughter. In these cases the skin measurement was considerably increased yet the swelling was circumscribed and hard and appeared cool and painless. These four reactions were accepted as negative.

Results of Survey

The results for each individual farm are set out in tables relating to each area (Tables *I*, *II* and *III*). The age group "3 years and over" includes all cows which had calved on two occasions and the majority of the heifers which had calved once. An occasional calved heifer was, on grounds of age, included in the group "2 to 3 years" which for the most part comprised in-calf heifers and bullocks over two years old.

Two of the farms A and G in Area *I*, had the history that a clinical case of tuberculosis had been removed some time previously. Farm A had since changed hands and much of the stock had been introduced during the two years previous to testing. Farm G, however, had been in the present tenant's occupation for many years and here the full effect of the occurrence of an open case of tuberculosis is seen in the 45·4 per cent. reactors among the stock of all ages.

On one farm, H in Area *I* (17 cattle) and on one smallholding, F in Area *II* (two cattle) no reactors were detected. Only one reactor was found in each of five herds. In the case of Farm D of Area *I* (17 cattle) the reactor

was a recently purchased three-months-old calf. In Area *II*, the reactor on Farm A (seven cattle) was a purchased cow, that on Farm B (13 cattle) a three-year-old purchased as a calf and that on the smallholding, Farm G a purchased cow. On Farm D of Area *III* (41 cattle) the reactor was a third-calf cow purchased as a calf. On each of these five premises infection was, therefore, detected only in a single *introduced* animal.

Table *II* sets out the results for each class of animal in each area and in the district as a whole. In this, as in some rearing districts, there is a very general tendency for the cow population to be remarkably old. Cows kept after calving the second time are commonly retained in the herd for the remainder of their productive life. One of the cows in this district, a reactor, was certainly 16 years old. The finding of 23·8 per cent. of reactors among the 109 cattle over three years old, however, compares very favourably with the figure accepted as the percentage of reactors among cows in dairy herds and suggests that further experi-

Table I.—The number of animals tested and number of reactors on each farm in Area I.

	3 years and over.		2–3 years.		1–2 years.		6–12 months.		2–6 months.		Total.		
Farm	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	% Positive.
A	4	2	4	—	23	2	5	1	3	—	39	5	13·0
B	3	2	—	—	4	—	—	—	—	—	7	2	28·0
C	9	4	6	—	13	—	4	—	4	—	36	4	11·2
D	4	—	3	—	3	—	3	—	4	1	17	1	6·0
E	3	1	—	—	3	1	—	—	2	—	8	2	25·0
F	10	2	23	4	6	1	—	—	14	—	53	7	13·2
G	4	3	—	—	4	—	3	2	—	—	11	5	45·4
H	5	—	—	—	10	—	2	—	—	—	17	—	—
Total	42	14	36	4	66	4	17	3	27	1	188	26	14·0

Table II.—The number of animals tested and number of reactors on each farm in Area II.

	3 years and over.		2–3 years.		1–2 years.		6–12 months.		2–6 months.		Total.		
Farm	Tested	Positive	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	% Positive.
A	3	1	—	—	—	—	4	—	—	—	7	1	14·4
B	1	—	5	1	3	—	4	—	—	—	13	1	7·7
C	9	1	1	—	12	1	9	—	—	—	31	2	6·4
D	9	1	1	1	10	—	6	1	—	—	26	3	11·5
E	13	1	5	—	4	—	21	2	—	—	43	3	7·0
F	1	—	—	—	—	—	1	—	—	—	2	—	—
G	1	1	—	—	1	—	1	—	—	—	3	1	33·3
Total	37	5	12	2	30	1	46	3	—	—	125	11	8·8

Table III.—The number of animals tested and number of reactors on each farm in Area III.

	3 years and over.		2–3 years.		1–2 years.		6–12 months.		2–6 months.		Total.		
Farm	Tested.	Positive.	Tested.	Positive.	Tested	Positive	Tested	Positive.	Tested.	Positive.	Tested.	Positive.	% Positive.
A	13	3	—	—	11	—	10	—	5	—	39	3	7·7
B	4	1	—	—	5	1	7	—	3	3	19	5	26·3
C	3	2	—	—	2	—	7	—	4	2	16	4	25·0
D	6	1	5	—	10	—	15	—	5	—	41	1	2·4
E	4	—	4	—	2	—	1	—	11	3	22	3	1·4
Total	30	7	9	—	30	1	40	—	28	8	137	16	11·7

Table IV.—The number of animals tested and number of reactors in district surveyed.

Area.	3 years and over.		2–3 years.		1–2 years.		6–12 months.		2–6 months.		Total.		
	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	Tested.	Positive.	% Positive.
		%		%		%		%		%			
1	42	14 33·3	36	4 11·2	66	4 6·0	17	3 17·6	27	1 3·7	188	26	14·0
2	37	5 13·5	12	2 16·6	30	1 3·3	46	3 6·5	—	— —	125	11	8·8
3	30	7 23·3	9	— —	30	1 3·3	40	— —	28	8 28·6	137	16	11·7
Total	109	26 23·8	57	6 10·5	126	6 4·7	103	6 5·8	55	9 16·3	450	53	11·8

Table V.—Reactors among Purchased and home-bred animals 2–12 months old.

	Age.	6–12 months.	2–6 months.	All animals up to 12 months.
Purchased	Number Tested	38	27	65
	Positive	4 (10·6%)	8 (29·6%)	12 (18·0%)
Home Bred	Number Tested	65	28	93
	Positive	2 (3·0%)	1 (3·6%)	3 (3·2%)
Total	Number Tested	103	55	158
	Positive	6 (5·8%)	9 (16·3%)	15 (9·5%)

ence will place the proportion of reactors in rearing herds at a relatively low level. The figure, 10·5 per cent. among 57 animals, for reactors in the age group two to three years old is high in comparison with those for the two succeeding age groups. This might be taken as an indication of the presence of sources of infection in the area but, as the number of animals in this group is relatively small and since a large proportion had been purchased, it would be unsafe to draw such a conclusion. An outstanding result is the finding of 16·3 per cent. of reactors among the 55 calves under six months.

Table *V* suggests the explanation of this high incidence. It shows the extent to which the young stock was purchased and sets out the percentage of reactors among home-bred as compared with purchased. Among the 27 purchased calves two to six months old, 29·6 per cent. reacted, whereas of the 28 home-bred only 3·6 per cent. reacted. Again, there were 10·6 per cent. of reactors among the 38 purchased as compared with only 3 per cent. among the 65 home-bred in the six to twelve months old group. This evidence demonstrates clearly that infection here is very largely imported into the district by the purchase of young calves from the great milk producing areas of the North West.

Summary

1. The incidence of bovine tuberculosis in an upland rearing district in North Wales was determined by submitting all the cattle other than calves under two months old (with the exception of about 32), to the double intradermal test in March, 1935.

2. Of the 450 cattle on the 20 farms and smallholdings, 11·8 per cent. reacted to the test.

3. The percentage of reactors detected in the various age groups was:—

	Per cent. Reacted.
Of 109 cattle over 3 years old ...	23·8
Of 59 cattle 2 to 3 years old ...	10·5
Of 126 cattle 1 to 2 years old ...	4·7
Of 103 cattle 6 months to 1 year old	5·8
Of 55 calves 2 to 6 months old ...	16·3

4. It is contended that the high percentage of reactors among the calves is due to purchases, already infected, from dairying districts.

Addendum

Since the foregoing was written, the survey of part of a more typical upland breeding area has been carried out. While one must delay general conclusions until the testing of the whole district is completed, the figures so far

obtained may be presented for comparison with those of the previous survey. Of 123 cattle classed as cows 16 (13 per cent.) reacted; of 63 cattle one to two years old only one reacted (1·6 per cent.); of 143 calves four reacted (2·8 per cent.). The number of reactors among all cattle over two months, 329 animals, in this area was, therefore, 21 (6·4 per cent.) and of these reactors 12 were purchased, most of them as calves, from outside the area. These figures do suggest that the incidence of tuberculosis in really typical breeding areas in North Wales is, indeed, very low.

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PART II

There are a few additional points arising from our work which we feel should be presented to you as a means of stimulating the later discussion on the facts and results already outlined.

In this work we have had our first experience of tuberculin testing calves, animals 2 to 12 months of age, in numbers. The particular interest of this lies in the fact that there is little information available regarding the incidence of tuberculosis among calves or even young stock. Abattoir statistics give the incidence among calves slaughtered for food at a level varying from 0·7 to 4·0 per cent. It must, however, be realised that the number examined is only a small fraction of the number born and, in all probability, these calves originated from the large milk producing areas of the country and were slaughtered within a few days of birth.. Our results, it seems, are the first figures illustrating the incidence of tuberculosis, as judged by reaction to the tuberculin test, among calves; particularly calves born in breeding areas, in no way interested in milk production. They also suggest a striking difference in the incidence among calves born in the large milk producing districts and transported through markets into rearing areas and among calves born in these areas.

Of the 158 calves tested, 9·5 per cent. gave a positive reaction to the tuberculin test; among the 40 per cent. purchased, 18 per cent. reacted, whereas among those home-bred the reactors were only 3·2 per cent. In addition, we were fortunate in having the opportunity to tuberculin test—in conjunction with the owner's veterinary surgeon—a large herd of Welsh Black cattle maintained for milk production as well as for breeding purposes. Among the adult cattle (over 2 years) approximately 30 per cent. reacted, but of the 64 calves only 4·7 per cent. gave a positive reaction to the test. All these calves were bred and reared on the farm and, with three exceptions, were pail-fed. In the light of the high incidence of infection in the adult stock this compares very favourably with the figure (18 per cent.) obtained, as reported above, in testing calves purchased from essentially dairy herds containing, we may assume, 40 to 50 per cent. of infected adult stock.

In future more attention will be paid to calf testing, for the Attested Herd Scheme demands the testing of *all* cattle on the premises and, in this, goes further than the regulations governing the production of Certified and Grade A (T.T.) milk. This need of clean young stock is appreciated elsewhere, for in this month's (November) issue of *The Veterinary Bulletin* there appears an abstract of an article by Petersen. It describes the plans and regulations for a rearing centre for *young* tuberculosis-free stock established by the co-operation of the Association of Co-operative Creameries with the Danish Ministry of Agriculture. This movement aims at the grazing of a 3,000 acre government pasture, by the young stock of those members of the creameries who have adopted a tuberculosis eradication scheme, but who have difficulty in keeping their young stock isolated at home. The calves are not allowed into the grazing unless accompanied by a veterinary certificate showing that they have recently passed a tuberculin test. They are kept on the grazing for a period of 18 months, being tested once during their first winter there and again before returning to their owners at the end of the second summer.

We suggest that the tuberculin testing of calves should be given more consideration and that far greater attention should be given to the rearing of calves free from tuberculous infection, since these animals can be made the nucleus for the establishment of a tubercle-free herd.

We cannot present these results without making some reference to the practical side of testing and a few points of interest and importance may well be raised to stimulate discussion. The first point concerns the use of synthetic medium tuberculin in preference to concentrated old tuberculin, which until recently was the test material. The Cambridge workers undertook to investigate more fully the factors concerned in the production of the non-specific reactions met with during tuberculin tests. This work was most successful and led to the production of synthetic medium tuberculin for field use. It is not intended to enter into any detailed explanation of this tuberculin, but it is devoid of many of the elements which in concentrated old tuberculin gave rise to the non-specific skin reaction, without its having been denuded of those elements essential to the specific tuberculin reaction. Anyone interested in the details is referred to the excellent articles by Glover and Buxton and Glover in the University of Cambridge, Institute of Animal Pathology, Director's Report No. 3 (1932-33) pp. 200-226 and pp. 227-236.

Our choice of this material in preference to

concentrated old tuberculin followed naturally upon a comparative test which we carried out. We could readily accept the superiority claimed for synthetic medium tuberculin. The difficulty of the "doubtful" or "border-line" reaction is much clarified, *i.e.*, by the use of S.M.T. the non-specific reactions (relatively large, yet well circumscribed swelling) are appreciably reduced in number, and the *negative* reaction is more clearly defined.

From a practical point of view also S.M.T. is more easily handled. It does not have the tendency of old tuberculin to become viscid, often necessitating warming before it can be drawn into a syringe. It is said that the pea, present after intradermal injection of old tuberculin, is not so evident in the case of S.M.T., thus rendering it difficult to determine a true intradermal injection. Admittedly the pea is not as distinct, but the fact that the injection was truly intradermal can be appreciated by the fingers holding the fold during the act of injection. Moreover, rather than detracting from its value, this seems a point in favour of S.M.T. as it helps in defining more clearly a *negative* reaction.

It is generally accepted that *the* means of deciding the category of a tuberculin reaction is on the score of the presence or absence of œdema and, possibly, pain. That is, a positive reaction is judged more by the character of the swelling than by its size. It seems reasonable to suppose, therefore, that skin measurements are of relatively little importance and one might wonder if they need be seriously considered. It is felt that they still have a place in tuberculin testing. Firstly, skin measurements are useful for record purposes. Secondly, they do on occasions attract attention to a positive reaction whose true character might otherwise be overlooked, especially when testing young unhandled animals in the confined space of a dark loose-box. Furthermore, they have a definite value in those doubtful reactions whose category one may define by revisiting on the fourth day. At the 96th hour the skin measurement of a positive reaction remains the same as on the 72nd hour or is even increased, while in the non-specific reaction it has diminished. Even expert and experienced clinical fingers will fail to appreciate a reduction of 1 or 2 mm. in a swelling.

During the survey the majority of the positive reactions were characteristic at the 48th hour and no second injection was necessary. There was, however, ample evidence to show that one injection does *not* suffice to determine positive reaction in every case. On our experience we could not agree with the suggestion that the second injection is unnecessary. As a matter of interest we have drawn up a table comparing the initial measurements with those at the 72nd hour.

Reading.	Age.		
	Adult.	6–12 months.	2–6 months.
	mm.	mm.	mm.
Initial	5	3·9	2·9
Average mean rise in negative reactor	2·4	2·1	1·9
Average mean rise in positive reactor	11	10	16·1

It must be appreciated, however, that in the majority of positive instances only one injection was made. The small figure for the mean increase among negative reactors illustrates the value of S.M.T. in defining clearly negative reactions.

The mean rise (16·1 mm.) in the case of positive reactions in the very young animal is very striking. At the time of testing one was impressed by the real regularity with which the reacting calf showed a swelling of considerable size. Each calf reactor was so distinctly positive at the 48th hour that, in no instance, was it necessary to make the second injection.

In reviewing the results of this survey one is tempted to wonder how far information of this kind might influence the policy of tuberculosis eradication in this country. The bogey of past schemes has been the cost of replacing the *40 per cent.* of reactors. Here, there is evidence that in the breeding districts there is a much lower figure with which to contend. There has been only one attempt in this country to eradicate tuberculosis from an *area*. Jordan's work in Ayrshire is well known and it will be recalled that it was experimental and, moreover, was carried out in a purely dairying district. The Milk Special Designations Order, 1923, has had the effect of establishing a number of *individual* tubercle-free herds and the Attested Herd Scheme has also the same object in view. Neither of these schemes, however, is designed to effect the eradication of tuberculosis from an *area*.

The undertaking of a survey of this nature was determined by a desire to discover the extent to which the main obstacle to area eradication—the disposal of a large number of reactors—would operate in a breeding district. Although far more extensive observations are necessary before achieving this end, this small survey suggests that the policy of area eradication in breeding districts is *not* beset to such a degree by this major obstacle and they might serve as starting points in any scheme for the eradication of tuberculosis from the country.

Discussion

The President (Mr. H. Llewelyn Jones) said that Mr. W. O. Jones, whom they expected to open the discussion, had wired to say that he

was unfortunately delayed, and therefore he (the President) suggested they might proceed with the discussion.

He was very much obliged to Dr. Montgomerie and Mr. Rowlands for their interesting contribution. He understood it to be their intention to establish a census with a view to eradicating tuberculosis from certain areas, and certainly the result of this investigation appeared very promising. If 2,000 head, which he believed was the figure which it was ultimately intended to test, responded in the same way as those which had already been tested, then the future would appear to be very bright. With regard to his area, he thought 40 per cent. of the milch cows would be found to be tuberculous. He was surprised to hear that in each case the calf gave a reaction after only one injection, and he would like to hear Dr. Montgomerie's explanation of this. He was also very interested in the high percentage of reactors amongst purchased cattle, and he felt that point should be brought home to the farmers in the tested areas. If only 3·2 per cent. of the young stock of herds which had never been tested before showed positive reactions, surely eradication ought not to present any insuperable difficulty. Unfortunately they knew that only too often the best calves were sold to pay the rent and the worst were retained. He would like to ask Dr. Montgomerie whether he believed that calves were infected before or after birth, and further, how soon after infection would a calf give a reaction to the test.

He thanked Dr. Montgomerie and Mr. Rowlands for their very interesting papers. The information they had secured was very encouraging, and he hoped they would obtain their 2,000 head.

Mr. F. Booth said he wished to ask the speakers a question regarding synthetic medium tuberculin. He had, he said, tested herds for four years with the old tuberculin and had recently turned to the synthetic medium tuberculin, since when he had had a large number of reactors. How long did the swelling remain after injecting the old tuberculin and how long after injecting the new?

Mr. J. H. Wynne observed that he merely desired to say that he considered the work of Dr. Montgomerie and Mr. Rowlands a definitely valuable contribution to our knowledge and he felt sure it would lead to something. He was greatly indebted to them for taking the matter in hand.

Mr. J. Cane, after thanking the speakers for their paper, said he believed the most striking feature which had been demonstrated in the test was the difference in the way upland-bred and lowland-bred calves had reacted. Was it not a generally accepted fact that the herding together of animals tended to encourage tuberculosis? He noted the high percentage of reactors among imported calves, and he accounted for that by the fact that it was the custom, when a cow in a milking herd had mastitis, to keep her apart and use her milk to feed the calves. He also thought that a number of the calves would be affected with congenital tuberculosis.

Mr. J. N. Bowen stated that he assumed that the reason why Dr. Montgomerie and Mr. Rowlands had conducted those tests was that they believed that the problem of eradication could best be tackled in breeding areas. But, taking the case of farm A in area I with eight cows and 31 young stock, where were the cows which were required for rearing the young stock to come from if all reactors were turned out of the herds? It had to be borne in mind that one would certainly buy possible and even probable reactors in order to supplement the herd. To him (the speaker) that was an important question regarding which he would like the essayists' views.

Mr. R. L. Lewis thought that Dr. Montgomerie and Mr. Rowlands were to be commended on tackling the problem in that manner. With regard to the high percentage of reactors in the purchased cattle, he agreed with Mr. Cane that it was largely a question of how the stock had been reared. He would follow up Mr. Llewelyn Jones's question regarding the interval between the time of infection and the earliest time at which a reaction could occur, by asking what was the earliest age at which calves had been known to have been tested.

Mr. G. J. Roberts expressed himself as being particularly interested in Mr. Rowlands' remarks regarding the technique of the test. He said that he often found it difficult to obtain a pea-like nodule after injection. If one inspected the injected cattle half an hour or so afterwards, was the presence of a swelling at the site good evidence that the injection was truly intradermal?

Mr. H. Williams thought that, in view of what had been said about purchased cattle, he ought to say that in his practice he tested a large number of Irish cattle and his experience was that the majority passed the test, but when tested after six months' sojourn in a tuberculosis-free herd, an appreciable number reacted.

Mr. O. C. M. Kay thanked the essayists for their very instructive papers. He would like to ask if they could explain how it was that amongst young calves (two to six months old) 16 per cent. reacted, whereas in older animals (six to twelve months old) only 5 per cent. gave positive reaction. Was it, he asked, because some of the reactors, as calves, overcame the infection during the next few months of their life or lost their ability to respond to the test?

Mr. W. O. Jones, after apologising for having been unavoidably delayed on his way to the meeting, said: When you, Mr. President, asked me to open the discussion this afternoon I knew it was useless to refuse. So I agreed, but not without a certain amount of trepidation. In the first place I am no speaker, and secondly, I know that there are others here to-day better able to do the work than myself. However, my task is very easy, for Dr. Montgomerie and Mr. Rowlands have both put the position quite plainly before us.

Tuberculosis has been very much to the fore during recent years, and in view of the seriousness of the disease we must admit that up to now the measures adopted with regard to its prevention are very inadequate. I saw it suggested somewhere that a sum of money equivalent to that voted for advertising clean milk was voted for the eradication of this disease. This is, on the face of it, ridiculous.

There is an old Welsh saying "Stabl gynnes a beudy oer—a warm stable and a cold byre." This was considered a safe condition for health, but someone discovered that by having a warm byre more milk was produced—but this was at the expense of lowering the resistance of the animal to disease. I suggest that this might be the cause of the prevalence of tuberculosis amongst cattle.

Dr. Montgomerie's object in bringing this matter before us to-day is to challenge the statements made by the People's League of Health, and the Economic Advisory Council's Committee on Cattle Diseases, that 40 per cent. of cows are infected with tuberculosis to such a degree that they will react to the tuberculin test. We must agree that it is equally important to secure

the figures as to the prevalence of this disease amongst beef-producing cattle. North Wales is essentially a cattle-rearing area and the area chosen by the speaker is characteristic of all the districts in which most of us practise. The conditions are typical—insanitary byres and yards, the same dark, unventilated calf pens in the remotest corner of the byre, the calves imported from the milk areas of Cheshire.

You will notice from the tables that cattle over three years and calves under six months show the higher percentage of reactors. The calves that react are those which are brought from dairy districts through the markets of Wrexham and Cheshire.

May I say that in my experience of the testing of Grade "A" (T.T.) herds, I get less reactors in the upland farms of Festiniog than in the farms in the valley, *i.e.*, less reactors amongst Welsh Black cattle on an upland farm than in the mixed herd of the valley. In the local meat inspector's report in my district rarely do I encounter a case of a condemned carcase. I believe one case was reported last year in the Llanrwst area. This supports Dr. Montgomerie's assertion that the incidence of tuberculosis amongst beef cattle is very low.

Mr. Rowlands' contribution is of interest inasmuch as he suggests the use of synthetic medium tuberculin in assisting us to determine the result in borderline cases, and this you will agree is a difficulty that most of us are up against in practice. Personally, I find it difficult sometimes to interpret the results and am glad to hear Mr. Rowlands' statement that with the synthetic medium tuberculin the non-specific reactions are appreciably reduced in numbers. The testing of calves does certainly minimise the bogey of all other schemes for eradicating tuberculosis in cattle, *viz.*, the replacing of the 40 per cent. of reactors.

The Replies

Replying to the discussion, Dr. Montgomerie said that although his object was to test 2,000 head of cattle, he considered it wise to report the results of his investigations to the Society as far as they had gone, and he was glad to avail himself of the opportunity of giving them an interim report. He hoped to extend the area in course of time.

Mr. Llewelyn Jones had asked why calves gave a definite reaction after only one injection. He believed the explanation lay in the fact that they had not been long infected, and therefore the type of sensitisation in the young animal might give a more pronounced result. Only a small percentage of calves, he thought, were infected before birth. There was no evidence to prove that there must be a macroscopic lesion before a reaction to the test was produced, and he thought many of the calves which they had tested would show no lesions on *post-mortem* examination. With regard to the period elapsing between infection and reaction to the test, he thought the time was one month. The importance of examining the reaction at the 72nd and 96th hours should be emphasised. They had come across cases where the reaction was doubtful at the 72nd hour but at the 96th hour the measurements remained as great, if they were not even greater.

It was difficult to answer Mr. Booth's question as to the comparative length of time the swelling remained when one was using old tuberculin as against synthetic medium tuberculin. It was only relatively recently that they had adopted the procedure of examining the doubtful reactions at the 96th hour.

Mr. Cane had suggested that many of the purchased calves became infected through being put to suckle cows with "bad udders" during the few days they remained in the dairy herds. He could not agree if it was suggested that this was a milk infection. He rather thought that the buildings in which these calves were kept for their few days on the dairy premises were to blame, in that they had probably housed open cases of tuberculosis. There was, furthermore, the possibility of infection during transport to, and actually in, markets. One could quite properly make a strong protest against the way in which young calves were handled in the average market.

Mr. Bowen had raised a most interesting point in emphasising the difficulty of obtaining replacements and avoiding the introduction of infected calves. These breeding farms had, quite obviously, to purchase calves. It was possible that many of the calves were only slightly infected and that the disease did not develop, the calf never becoming an open case. Satisfactory arrangements for the direct transport of calves from Grade "A" (T.T.) farms to the breeding areas should not be impossible of attainment.

With regard to the incidence of tuberculosis amongst Irish cattle, he agreed with Mr. Williams that these animals usually passed the test on arrival, but many reacted a few months later. Possibly they were bought through infected markets.

To Mr. Kay's query he would say that it was probably only accidental that the incidence among the two to six months' old animals was much greater than among the six to twelve months' old animals. The numbers dealt with were so small that they could not be taken to indicate any real change in incidence. He certainly did not think the calves did overcome infection or lose their ability to react.

Dr. Montgomerie said that he hoped he had answered all the questions put to him. He appreciated very much the interest which had been shown in Mr. Rowlands' work and his own, and he thanked the members for receiving his remarks so kindly.

Mr. Rowlands, in reply to Mr. Roberts, said he would emphasise one point regarding the injection. If the fold of skin was held between the thumb and forefinger while injecting, the actual entry of the tuberculin into the deeper layers could be appreciated. He readily agreed that inspection of the site some half-hour later would show quite a definite swelling if the injection was truly intradermal.

In reply to Mr. Llewelyn Jones, he thought no hard and fast rule could be laid down as to the period of sensitisation. It varied with the individual.

A CHAMPION OF ANIMALS

In the course of its notice of the "Animal Year Book" (vol. iii.) issued by the University of London Animal Welfare Society and already reviewed in *The Veterinary Record* (August 31st, 1935, p. 1076), *The Lancet*, December 21st, states that the account of work for the protection of animals in North Africa revolves about the almost legendary figure of Mlle. Ruperto. This lady, an Italian by birth, has, by astonishing evangelism and feats of courage, done much to improve conditions of life for donkeys, dogs, cats and farm animals in Algiers, where she is now the secretary-general of a newly formed branch of the R.S.P.C.A. and has succeeded in making things difficult for the organisers of bull-fights.

HORSE *VERSUS* MECHANICAL TRANSPORT

Experience in Durban

W. A. DYKINS, M.R.C.V.S.

Director, Durban Municipal Abattoir

The very vexed question of horse *versus* mechanical transport has been under consideration for a somewhat lengthy period in administrative circles of this city. This is indeed the age of motor-cars, and other contrivances, so it is not altogether surprising that certain councillors, heads of departments, etc., should be affected with what I would term the ubiquitous mechanical complex. I am happy to state, however, that the prevailing opinion here is that the needs of our city will be best served by a combination of both forms of transport, and reference will be made to this point at a later stage in these notes.

I am sure we are all grateful to Major-General Sir John Moore for the most valuable propaganda work he has carried out, and that we, as fellow members of the veterinary profession, have the greatest admiration for the sustained interest he has shown in the cause of the horse. Major-General Sir John Moore has made valuable contributions to the literature on this subject and he appears to have an inimitable way of marshalling his facts which renders all articles written by him so very convincing.

The reasons which prompt me to offer my quota of support on this important question to the veterinary profession are the following: I am in a position, through our costing and audit system, to give precise figures, and secondly, I can give fairly impartial evidence, as, supposing that horse-drawn transport were eliminated totally, the emoluments of my office as Director of the Abattoir would remain the same and I would have less responsibility. The management of the stables is simply tacked on to my position, and no additional pay is involved.

The horses at this depôt number, at the present, 191, most of which are the progeny of Clydesdale or Percheron stallions and colonial mares, the average cost being about £30 each.

One hundred and seventy-two units, each consisting of horse, cart, harness and driver, can be supplied daily at a cost of 9s. comp'ete. Scotch carts used on road or building construction have a capacity of 1 cubic yard, and horse refuse collection and street cleaning carts 2 cubic yards. The charge of 9s. is for a working day of eight hours, thus working out at 1s. 1½d. per hour. It is difficult to conceive of a more economical form of transport. The low cost, in comparison with those given in the article referred to, is due mainly to the fact that, instead of European drivers, Indians are employed on this duty, receiving a wage of, approximately, 3s. 2d. per diem, including rations and accommodation, which is considered a very fair wage for this type of labour. Carts are issued Departmentally, approximately 60 being sent out daily for house refuse collection and street cleaning work, and about 85 on duty with the City Engineer's Department (Works) for work on road construction and maintenance, and various other engineering undertakings. Several other vehicles (trollies, water-carts, etc.), are also sent out by this depôt but are not taken into consideration in this article as there are no figures with which to compare. The carts referred to cost from £25 to £30 each.

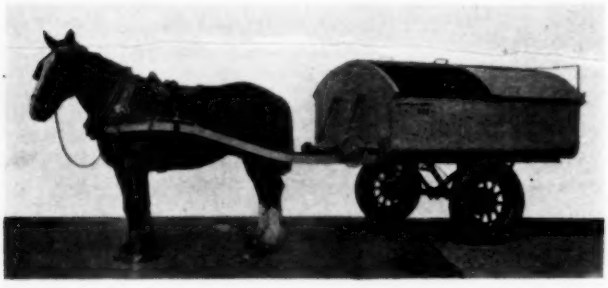
Rations.—A ration of 25 lb. is issued to each animal per diem, consisting of lucerne, compressed fodder, crushed mealies, teff hay and bran, and a small allowance of a mineral lick. The market for these commodities is closely studied and variations are made from time to time. The cost averaged last year 1s. 2d. per horse per diem.

The determining factor is obviously one of cost, and in this connection the question of the vehicle capacity is of prime importance.

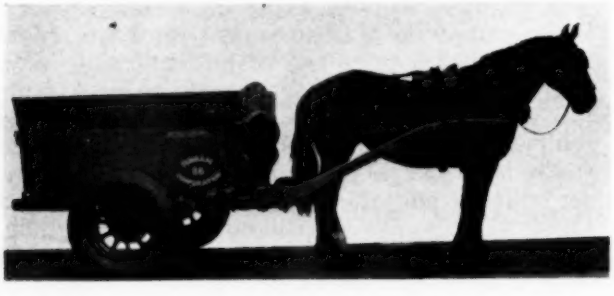
The article by Major-General Sir John Moore does not, in my opinion, contain sufficient detail to enable an effective comparison to be arrived at. For instance, the cost of a single-horse vehicle works out, according to figures given, at 2s. 2½d. per hour, but the cart capacity is not stated, nor the number of loads hauled. These factors are of fundamental importance when arriving at a comparison. Of course, the ideal way would be to give also, the distance hauled. When this is done the cost of yard mileage, *i.e.*, cost of hauling one yard per mile, can be arrived at. This system is now being put into operation here.

In arriving at our costs, charges comprise drivers' and stableman's wages, insurance, feeding, saddlery, grooming, veterinary attendance, shoeing, clerical salaries, office expenses, rent, rates, lighting, telephone, depreciation on horses (average life estimated at seven years), depreciation of vehicles (average life reckoned at ten years), repairs, interest on capital outlay, etc. All saddlery and farriery and all cart repairs are effected on the premises. All costs are subject to audit by Municipal and Government auditors.

A recent comparison of the cost of removing house refuse by our horse-drawn carts against mechanical freighters shows that there is a fractional advantage in favour of the freighters, the costs being 1s. 11·89d. per yard for carts and 1s. 11·54d. for the freighters. We are now putting into commission a few carts with a capacity of 3 cubic yards and confidently look forward to reducing our costs below those of



the freighters. These carts (a photograph of which is reproduced) are constructed locally, all steel and fitted with pneumatic tyres and roller bearing axles. The sliding covers effectively prevent rubbish blowing from carts and minimise offensive smells, etc. The cost of these carts is £63 15s. each. Also enclosed is a photograph of Scotch carts, similarly fitted with tyres and bearings, having an original capacity of 1 cubic yard but fitted with detachable "wings" enabling capacity to be increased to 1½ and 2 cubic yards. The carts cost £50 each. Similar carts are in use by the Municipality of Bloemfontein, O.F.S., in fact, I believe they were the original users in South Africa.



If horse-drawn transport is too rapid for the refuse collectors who make a house-to-house collection, why go to the expense of engaging a more expensive form of transport? The frequent stoppages and starting take the life out of a mechanical vehicle and are costly in petrol, oil and battery renewals, etc. The city engineer is fully in accord with me that the ideal way of meeting the position would be a combination of equine and mechanical transport. If this system were inaugurated the house-to-house collection could be carried out by horse-drawn transport, and, when the carts are filled, the rubbish could be taken to, and deposited at some centrally placed dumping depôt. There should be a large concrete platform with chutes at this depôt, and rubbish could be off-loaded on the platform and pushed down the chutes into waiting freighters and conveyed by them to the recognised dumping ground some distance away. By adopting this method we are supporting the dictum that for short hauls with frequent stoppages horse-drawn transport is the most economical and effective, but for longer hauls without such stoppages mechanical transport is supreme.

Although motor traffic is increasing daily in this city as in others, traffic congestion is still insufficient to warrant the exclusion of horse-drawn transport from the streets.

In the article under review, reference is made to the benefits derived by the farmers through the employment of horse-drawn transport in towns. The points raised are most interesting and affect this country in a similar manner. This depôt spends on foodstuffs and animal replacements approximately £5,000 per annum, and the money is therefore retained in the country instead of being used to import petrol, etc.

In concluding these notes, I would like to express my indebtedness to Messrs. Dunlop Rubber Co., S.A., Ltd. (Durban), for the assistance rendered in evolving suitable types of vehicles, and to our accounting branch for figures supplied.

ACCREDITED STANDARDS "THE MINIMUM"

Addressing the members of the Bolton Agricultural Discussion Society on accredited milk production, Mr. R. C. Locke, Chief Veterinary Officer for the City of Manchester, declared that the standards required for accreditation under the accredited herd scheme were really only those which should obtain for every dairy farm—they were a minimum, not an ideal. Mr. Locke expressed the view that at present veterinary inspection of cattle is in its infancy in this country, but the scheme would unquestionably help in obtaining this service, which in his opinion is long overdue. If regular routine inspection of all dairy herds, not fewer than four times a year, became generally operative, he was sure there would soon be an appreciable reduction in the incidence of animal diseases.

The scheme, said Mr. Locke, was introduced, to encourage the farmer to bring milk up to the accepted minimum standard of purity—that for Grade A milk, which had been in existence since 1923. The enormous advance that had been made in a very short space of time emphasised how urgent was the need for such a measure. There was reason to hope that the position twelve months hence would be such that the authorities would have to consider the next step. What that would be he did not know, but it was obvious that a scheme which depended for bonus payment on levies from producers, including the bonus earners, must of necessity need alteration when the number of bonus earners became so large that the levy would equal the bonus. The primary aim, however, was to bring the general level of production to the Grade A standard, after which it was possible that the producer who failed to attain that level might find himself barred from selling his milk in the fluid market for public consumption. He did not suggest that position would arise in, say, another year's time, but it could not be far distant at the present rate of progress. The Grade A standard was well within the reach of every milk producer who would take the necessary time and trouble, and saw that his employees carried out a fairly simple set of rules. The keystone was cleanliness from start to finish.

Abstracts

[**Luxation of the Patella in Horses.** Krüger. (1935.) *Zschr. Veterinärk.* **47.** 6. 435.]

A most instructive article incorporating the substance of over 40 papers by other authors, a full description of the anatomy of the stifle joint and a discussion on the surgical pathology of this luxation. The information thus made available is best dealt with systematically.

Occurrence.—Luxation of the patella in horses is sometimes observed in various classes of horse, more commonly in young animals of heavy breed. It may be complete or incomplete, momentary, stationary (dislocation) or habitual-momentary (recurrent) and the bone may be displaced upwards or outwards. It is usually unilateral.

Causes.—Predisposing causes include lack of adjustment between the parts of the femoro-patellar joint (slack ligaments, etc.) and debility from any cause; thus many case records given show that the luxation took place at the time when the horse was under treatment for, or convalescent from, colic, strangles and such medical disorders. The result is a loss of tone in the supporting structures of the joint. Exciting causes include sudden movement of the limb, *e.g.*, a kick or jump or wrench of the stifle joint. Lateral luxation is also caused by a pre-existing gono-trochlitis, deforming inflammation of the trochlea of the femur with the disappearance of the groove and/or of the lateral ridge.

Symptoms.—Upward luxation is characterised by forced extension of the limb, the horse standing on three legs with the fourth held stiffly out behind with the toe of the hoof on the ground. There is great reluctance to move and the affected limb is swung outwards and forwards in one piece. Lateral luxation, on the other hand, is characterised by flexed stifle and hock and the inability to bear weight on the limb. Young horses with upward luxation are sometimes able to reduce it spontaneously by taking a few forward steps.

Diagnosis does not present much difficulty after a physical examination has been made. It is interesting to observe here that Williams put forward the theory that upward luxation is of muscular origin—cramp of the quadriceps femoris muscle resulting in abnormal upward traction of the patella, and Krüger differentiates this as a separate condition for which he recommends massage and forced exercise.

Prognosis.—Upward luxations are always curable, but lateral luxations, when there is deformity of the trochlea, are incurable: with no such deformity they often do well.

Treatment.—Simple momentary luxations are usually curable by appropriate manipulation, the upward type by downward pressure on the patella simultaneously with forward traction of the limb by a rope fixed to the fetlock, and the lateral type by inward pressure on the patella. If this fails on the standing horse it must be done after casting. After reduction of the luxation the horse should be kept at rest in a very narrow stall for some days. A blister is helpful in immobilising the stifle joint at this time. Obstinate or recurrent cases of upward luxation are nearly always curable by dividing the medial patellar ligament. In the author's case, a cavalry horse, bilateral upward luxation was so treated with very good results and a quick return to soundness.

J. E.

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[**An Epidemic of Coughing in Horses.** Walker, W. H. (1935.) *J. Roy. Army. Vet. Corps.* **7.** 1. 5-7.]

This is an unofficial account of the recent coughing epidemic as it affected horses of the Army. The outbreak covered the months of July, August and September of 1935. Onset was sudden and widespread. Close grouping of animals and stabling in ill-ventilated and unhygienic stables favoured its spread. Every unit of the Army was affected to an extent varying between 25 per cent. and 100 per cent. of its animal strength. The period of incubation was found to be seven to eight days and the duration of the disease in individual animals varied from seven to twenty-one days with an average of twelve. The disease took three to four weeks to pass through a unit.

A spasmodic, painful, hollow cough was the only pronounced symptom, but in some cases this was accompanied by a thin, watery, nasal or conjunctival discharge. Pyrexia was not constantly shown unless affected animals were worked. The appetite and condition remained good throughout. In the treatment of cases, rest and picketing in the open proved beneficial. No complications were seen and there was no mortality. One attack appeared to confer immunity.

C. D.

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[**I.—Equine Piroplasmosis in Haute-Marne.** Béchade, Desroziers and Pelletier. (1935.) *Rec. Méd. vét.* 3. 4. 197-203.

II.—The Treatment of Equine Piroplasmosis with Gonacrine. Logé, G., and Guilhon, J. (1935.) *Bull. Acad. vét. France.* **8.** 3. 172-177.]

I.—The existence of equine piroplasmosis in the Haute-Marne Department of France has been known for several years, but recently it has been encountered in a new region to the east which, unlike the other location, is neither wooded nor swampy. This paper gives details of nine cases of the disease met with in this

area. In all of them the causal organism proved to be *B. caballi*. The transmitting agent was considered to be *I. ricinus*, which was recovered from four of the cases. The authors remark on the scarcity of ticks on horses and their frequence on other animals of the farm. The symptoms described are those commonly associated with this disease, the absence of hæmoglobinuria and icteric discoloration of the visible mucous membranes being specially commented upon. The usual difficulty was experienced in demonstrating the presence of the piroplasm. Diagnosis was made further difficult by the existence of equine infectious anæmia in the same locality. The authors remark on the many symptoms in common between the two diseases and quote a case of dual infection.

In the treatment of cases eminently satisfactory results were obtained by the use of gonacrine in 1 gramme doses. This drug the authors regard as almost a specific therapeutic agent and consider that, for this reason, it may also be employed in cases of doubt for diagnostic purposes.

II.—This paper is a clinical record of the results obtained in the use of gonacrine (chlorhydrate of diamino-acridine) in the treatment of *B. caballi* infection of horses in France. Details of five cases are given. The drug was administered intravenously in doses of 1 gramme (20 c.cs. of a 5 per cent. solution) and was tolerated without the slightest ill effect. Following this injection there was a marked diminution of the number of parasites present in the circulating blood and eventually they disappeared completely. A drop in temperature was shown in six to eight hours with a return to normal within 48 hours. Marked improvement in appetite and the general appearance of animals was noted.

The authors consider that this drug is superior in every way to trypan blue, an additional advantage being the relatively small quantity of solution which has to be introduced into the vein.

C. J. D.

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[**Central Aphonia: Semiology of Brain Diseases in Dogs.** Naudin. (1934.) *Rev. gén. Méd. vét.* **43.** pp. 526-529.]

Aphonia, or the loss of voice, occurs occasionally in dogs and in the absence of any lesion of the larynx is of nervous origin. The author gives four case records of aphonia of nervous origin in dogs, but only one of them was an uncomplicated aphonia—in a three-year-old German shepherd watch-dog which remained vigorous and otherwise healthy during some months' observation. It was killed on account of its loss of practical value and on autopsy its larynx was found to be normal.

The three other cases occurred in a 15-months-old dog recovering from distemper, in an eight-year-old Pekingese and in an aged German shepherd dog—all showing, in addition, other symptoms of nervous disease: paraplegia, hemiplegia, facial, mandibular and ocular paralysis, etc. The first two cases recovered.

J. E.

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[**Studies of Total Erythrocyte and Leucocyte Counts in Fowls.—II.** Palmer, E. J., and Biely, J. *J. Amer. Vet. Med. Ass.* **86.** 5. 594-599.]

Total erythrocyte and leucocyte counts were made of three groups of birds before and subsequent to 48 hours' starvation. In 31 out of the 39 birds examined there was an increase in the erythrocyte count, while in eight there was a slight decrease. The leucocyte counts showed that with one exception a consistent and significant decrease of leucocytes occurred in all birds. The percentage decrease of leucocytes in the three groups was 23·1, 27·7 and 28·3.

It would appear from the data that in making blood counts of normal or diseased fowls, the interval between the last feeding and the time the counts are made must be taken into consideration. A standard procedure with regard to the time of feeding and carrying out the blood count should be followed in order to avoid fluctuations resulting from partial starvation. Most investigators have found a wide variation in the number of erythrocytes and leucocytes in the blood of normal fowls, and it is possible that a systematic study of the blood of fowls with regard to the time of feeding, and type of food, would throw some light on these apparent fluctuations and variations.

R. F. G.

WILD AND DOMESTIC CATS

As the result of the measurement of a large number of Scottish wild cats (*Felis sylvestris*), including 42 specimens received complete in the flesh and 70 skulls, John C. Kirk publishes a useful comparison between the wild and domestic cats (*Scottish Naturalist*, 161; 1935). Domestic cats which have run wild soon assume the characters of the wild race, developing longer and coarser fur, longer limb-bones and larger teeth, and after two or three generations in a wild state would be scarcely distinguishable from the true wild cats, and the author thinks that probably there is a certain amount of domestic blood in the wild cat of the present day. In spite of these difficulties and of the fact that no single feature in the skull of the wild cat may not occasionally be duplicated in the domestic cat, the author gives a series of distinguishing marks which can generally be relied upon. On the whole, while the lower jaw is more strongly developed and the muscular ridges of the skull are strongest in the wild cat, the bones of the cranium are generally lighter and thinner than in domestic cats. The wild cat has longer limbs, longer and coarser fur, larger teeth, but shorter small intestine (43 to 51 in. against 58 to 66 in.). —*Nature*.

Reports

LIVESTOCK IMPROVEMENT SCHEME

Report for the Year 1934-35: II

MILK RECORDING

Table XI sets out the number of members of Milk Recording Societies in each year since 1917-18. The membership of Milk Recording Societies in 1933-34 showed an increase over the year 1932-33; there is at present every indication that this increase in membership will be maintained next year.

Average Yield of Recorded Cows. — The summer of 1934 was again fine, and, as in the previous year, there was prolonged drought, so that there was a consequent shortage of grass, and this had an adverse effect on milk yields in general. The average yield of full-year cows in 1933-34 was 704 gallons, and this, while showing an increase of 4 gallons over 1932-33, was still well below the record average yield of 719 gallons obtained in 1930-31. The Derby and District Society had the highest average yield with 8,250 lb. (798 gallons), while Essex, Lancashire, Norfolk and Yorkshire also exceeded 8,000 lb. (774 gallons). The number of individual herds with average yields for full-year cows of 8,000 lb. (774 gallons) or over was 1,193, or 28 per cent. of the herds recorded for the full year, as compared with 1,191 in the previous year. Herds with average yields of 10,000 lb. (968 gallons) or over numbered 254, against 241 in 1932-33.

Table XIII contains some examples of the increases that can be effected in the average yield of herds as a result of the greater attention to breeding, selection and feeding, and the elimination of low-yielding cows that usually follows the adoption of milk recording.

The number of cows that reached the standard yield of their breed or type in 1933-34 was 17,905, which compares with 16,764 in 1932-33. The number of Shorthorns that gave the standard yield of their breed increased from 7,994 to 8,316, while Guernseys increased from 1,393 to 1,711 and Friesians from 4,552 to 4,818. The highest yield during the year was 30,269 lb. (2,929 gallons) given by a Friesian cow owned by a member of the Essex Society.

In Table XV it is shown that the number of Shorthorns recorded increased from 77,525 to 79,639, and Ayrshires from 4,114 to 5,438, while there were increases of between 500 and 1,000 in the number of Friesians, Guernseys and Jerseys.

Issue of Certificates.—The number of Certificates of Merit issued in respect of the three years ended October 1st, 1934, was 562, as compared with 641 for the previous three-year period. Certificates of Merit are only awarded on application by the owner, and on payment of a fee of 5s. per certificate, for cows that have given during a period of three consecutive Milk Recording Years the prescribed yield of milk for their breed or type and have been regular breeders. The number of members of societies who obtained Certificates of Merit was 182, a decrease of 19 as compared with the previous year. The highest yields certified for the various breeds were: Friesian, 66,933 lb.; Red Poll, 52,590 lb.; Shorthorn, 51,370 lb.; Ayrshire, 51,121 lb.; Jersey, 42,128 lb.; and Guernsey, 39,604 lb.

Register of Dairy Cattle.—Volume XVIII of the Register of Dairy Cattle was published early in June, 1935, and contains particulars of the 606 cows in respect of which Certificates of Merit have been issued since the publication of Volume XVII.

Calf and Bull Marking.—The number of calves marked under the Ministry's scheme for the earmarking and registration of calves of milk-recorded cows was 14,771, an increase of 84 over the previous year. The number of heifer calves marked constituted 91 per cent. of the total, but 1,298 bull calves were marked as compared with 1,190 the previous year, this being the highest number ever registered. The number of bulls being used for service, and earmarked and registered by societies for their members was 41.

Testing for Butter-fat. — The Ministry's Regulations relating to Sampling and Testing for Butter-fat came into force on October 1st, 1933. The scheme was adopted by 759 farmers, or about 18 per cent. of the total members of Milk Recording Societies, and testing was carried out in 831 herds containing 24,000 cows. The total number of cows tested was 9,959, of which Friesians, Shorthorns and Guernseys accounted for approximately 75 per cent. The remainder consisted mainly of Jerseys, Ayrshires and Red Polls. An average of over 5 per cent. of butter-fat was yielded by 1,190 cows, practically all of which were Guernseys and Jerseys, while 2,953 averaged between 4 and 5 per cent.

Rationing.—Advice on rationing, as hitherto, has been given by County Agricultural Organisers, but there is a tendency in some parts of the country for the number of enquiries to decrease owing to the more general use of proprietary foods and to the fact that members are now more versed in food values.

Progeny Recording of Dairy Bulls.—The Milk Recording Scheme was extended as from October 1st, 1934, to include a voluntary scheme for the progeny recording of dairy bulls.

Cost of Milk Recording.—The average cost of Milk Recording in 1933-34 showed little

change as compared with the previous year; members paid on an average 4s. 3d. per cow and the Ministry's grants averaged 1s. 11d. per cow. J. M.

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GOLD COAST COLONY

Report of the Department of Animal Health for the Year 1934-5

The Department is under the control of a Principal Veterinary Officer (Mr. J. L. Stewart, M.R.C.V.S., B.SC.), who also acts as pathologist. He is assisted by four European veterinary officers, and one European laboratory assistant and a large native personnel, some of whom have been trained as technical assistants at the Department's native-training centre. Much of the work undertaken by European assistants in other Colonies is carried out efficiently and well by these trained natives.

It is pleasing to note that the Department has arranged a closer liaison with the French veterinary authorities operating over the frontiers of the Colony. This should lead to mutual benefits in many directions, and at the present time to a more adequate protection of the Colony's rinderpest-free herds. The cattle population of the Northern Territories of the Colony has been freed of rinderpest and maintained so at much expense, and until such time as rinderpest is suppressed in contiguous colonies the annual vaccination of young susceptible stock must be pursued on account of the presence of so close an infection.

Vaccination against rinderpest has been the principal activity of the Department. In addition to the annual immunisation of the young stock in the cleaned areas, initial immunisation of the remaining susceptible herds in the southern parts of the Colony was continued. Immunisation was carried out by the serum-simultaneous method and the results on the whole were highly successful. The native cattle owners have by now realised the advantages of vaccination and endeavour to help instead of to impede the work.

The widespread distribution of tsetse flies and the consequent prevalence of animal trypanosomiasis in the Colony present a fresh and a formidable task for Mr. Stewart and his staff, now that they have successfully overcome rinderpest. We hope they will be able to undertake this new work with the same Government support and similar native co-operation which helped towards their creditable campaign against rinderpest. Already bush-clearing experiments have been initiated and some interesting data are recorded of the experiences so far obtained.

An outbreak of contagious bovine pleuropneumonia which assumed threatening proportions was energetically and effectively suppressed by the slaughter of affected and in-contact animals, quarantine restrictions and vaccination. The Colony was free of the disease at the end of the year.

Amongst other diseases encountered were: anaplasmosis, anthrax, contagious bovine abortion, piroplasmosis, theileriasis, rabies, canine distemper, heart-water in goats and some poultry diseases.

The reports of the Laboratory and Husbandry sections contain much useful information which space does not allow one to deal with here.

The report can be obtained from the Crown Agents, 4, Millbank, London, S.W.1, at a cost of two shillings.

W. K.

N.V.M.A. Divisional Reports

NORTH WALES V.M.A.*

ANNUAL MEETING AT RHYL

The Annual Meeting of this Division was held on the afternoon of Friday, November 29th, 1935, at the Imperial Hotel, Rhyl.

The President (Mr. H. Llewelyn Jones) occupied the Chair and there were also present Messrs. Bate, Booth, Bowen, Cane, Cartwright, Dr. R. Dalling, Messrs. H. V. Hughes, W. F. Hughes, W. O. Jones, Kay, Lewis, Dr. Montgomerie, Messrs. Roberts, R. S. Rowlands, W. T. Rowlands, H. Williams, J. Ll. Williams and Wynne.

Apologies for absence were received from Mr. Edwards, Principal Hobday, Messrs. W. Hughes, W. Jones and Savage and Professor Share-Jones.

The minutes of the last meeting, having been published in *The Veterinary Record*, were taken as read and were confirmed.

Communications.—(1) From the National Horse Association. It was agreed that the resolution passed at the last meeting relating to the matter of the Division's subscription to the Association be rescinded and that the Division subscribe £1 1s. to the Association for the present year.

(2) From Dr. Griffith Evans, thanking the members of the Division for their good wishes on the occasion of his birthday.

(3) From Mr. Storrar, Prestatyn, tendering his resignation from the Division. It was agreed that Mr. Storrar be asked to reconsider his decision.

(4) From the N.V.M.A. relating:—

(*a*) to the nomination by Divisions of members on the N.V.M.A. Council.

* Received for publication December 18th, 1935.

(*b*) to the report of the Special Committee on Fur-bearing Animals, etc. The Secretary gave a brief résumé of the main points of the report.

(*c*) to the question of the payment of the expenses incurred by Divisional representatives in attending meetings of the N.V.M.A. Council or Committees.

It was agreed that the railway travelling expenses of the representatives of the Division on the Council of the N.V.M.A. in attending meetings of the Council or its Committees be defrayed by the Division for a further period of twelve months.

(*d*) to the award of the Dalrymple-Champneys Prize.

(5) From Mrs. Hughes, Pwllheli, and Mrs. Lloyd, Deganwy, acknowledging the Society's expressions of sympathy in their bereavement.

Nomination of Fellow.—On the proposition of the Hon. Secretary, seconded by the President, Professor J. F. Craig, Liverpool, was nominated for Fellowship.

Election of Fellows.—Dr. R. Dalling and Mr. J. Ll. Williams, who had been nominated at the last meeting, were unanimously elected Fellows of the Society.

Finance.—The President then called upon the Hon. Treasurer to make his financial statement. Mr. Cartwright reported a substantial credit balance and he was thanked for his services.

ELECTION OF OFFICERS

The following were elected to hold office for the year 1935-36:—

President.—Mr. H. Llewelyn Jones.

Vice-Presidents.—Mr. W. Hughes and Mr. R. L. Lewis.

Hon. Treasurer.—Mr. C. W. Cartwright.

Hon. Secretary.—Mr. H. V. Hughes.

Other Members of Council.—Mr. W. O. Jones and Dr. Montgomerie.

Auditors.—Mr. R. L. Lewis and Mr. W. H. Savage.

Paper.—The President said that they then came to the most important item on the agenda, namely, the paper of Dr. Montgomerie. He understood, too, that Mr. W. T. Rowlands had some remarks to make bearing on that aspect of the work with which he had been particularly concerned, and he would ask Mr. Rowlands to address the meeting after the conclusion of Dr. Montgomerie's remarks and before the discussion commenced. He had great pleasure in calling upon Dr. Montgomerie to address the meeting on "The Incidence of Tuberculosis in a Cattle-rearing District in North Wales."

[The joint paper by Dr. Montgomerie and Mr. Rowlands is reproduced, together with the discussion which followed its presentation and the essayists' replies, at the commencement of this issue.—*Editor.*]

Votes of Thanks.—The President then called on Mr. Lewis to propose and Mr. Bowen to second a vote of thanks to Dr. Montgomerie and Mr. Rowlands for their address. This was carried amidst acclamation, and Dr. Montgomerie briefly responded, thanking the members for their criticism and expressing his pleasure that his efforts and those of Mr. Rowlands had been so well received.

Next Meeting.—It was agreed that the next meeting be held at Corwen.

The meeting then terminated and, on the President's invitation, the members were later entertained to tea.

H. V. Hughes, *Hon. Secretary.*

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WEST OF SCOTLAND V.M.A.*

MEETING AT GLASGOW

A meeting of this Division was held in the George Hotel, Glasgow, on Wednesday, November 27th, 1935, at 4.30 p.m.

The President, Mr. Wm. Watt, occupied the Chair and the following members signed the attendance book: Messrs. D. Campbell, J. F. Taylor, Wm. Anderson, David Brown, Jas. McFarlane, H. Begg, junr., H. H. Brodie, W. L. Weipers, R. M. Smith, Professor Wm. Robb, Messrs. C. Tracey, Alex. Pottie and the Hon. Secretary, Alex. Thomson, while there were present as visitors, Messrs. Nicol Nicholson, M. H. W. Miller, A. M. K. McLeod and S. G. Abbott.

The minutes of the last meeting, as printed in *The Veterinary Record*, were adopted.

Apologies for absence were received from Messrs. John Weir and Robert Mitchell, and Professor G. W. Weir.

Nominations for Membership.—The following were nominated for membership: Messrs. S. Jamieson, Nicol Nicholson, S. G. Abbott and Miss H. J. Mitchell.

Elections to Membership.—Messrs. M. H. W. Miller, A. M. K. McLeod and John Weir were elected members of the Division.

Correspondence.—Arising out of the correspondence, the Secretary was instructed to write to the Secretary, N.V.M.A., in answer to his letter of October 17th, in which were given the views of the Finance and General Purposes Committee on the question of the repayment of expenses incurred by Branch and Divisional representatives attending meetings of the Association, pointing out their dissatisfaction with the views expressed in the Committee's report.

Address by the President.—The President then gave an address embracing the Diseases of Animals Acts, which was listened to with great interest by the members, illustrating as it did,

* Received for publication December 20th, 1935.

the great value to the nation of these measures in the past and pointing out the additions or amendments which might be made which would render them of even greater value in the future. His manner of presenting this subject, which on first thoughts might seem somewhat "dry," was both instructive and amusing.

The members then adjourned for tea. In the short discussion which followed, it was made clear that the members had not only enjoyed the paper, but had benefited much from its presentation.

Vote of Thanks.—Replying to a vote of thanks, Mr. Watt said that he felt he had been amply repaid for his trouble in the knowledge that his paper had been of some value, however small, to the members.

This terminated the meeting.

Alex. Thomson, *Hon. Secretary.*

NON-INFLAMMABLE PYRETHRUM SPRAY FOR MOSQUITOES

The increase of international travel by air (says *The Pharmaceutical Journal*) has provided new problems in controlling the spread of diseases. In the case of yellow fever, the destruction of infected *Aëdes ægypti* in aeroplanes while in flight is suggested as one means of restricting the possible spread of the disease. A mixture of 1 part pyrethrum extract in kerosene (containing 2 per cent. pyrethrins) with four parts of carbon tetrachloride has, in four tests, killed 100 per cent. of mosquitoes with five minutes' exposure, when five mils were sprayed per 1,000 cubic feet. By ordinary tests the mixture is non-inflammable and easily tolerated by human beings for the length of exposure necessary to kill the insects. The foregoing facts are reported by Williams and Dreessen in U.S. Public Health Reports, 1935, **50**, 1401.

South African Veterinary Medical Association

Twenty-ninth General Meeting

Dr. H. H. Curson, Government Veterinary Surgeon, Research Laboratory, Onderstepoort, Pretoria, South Africa, sends us the photograph reproduced below, of the members attending the Twenty-ninth General Meeting of the South African Veterinary Medical Association, Onderstepoort, on September 12th, 1935. "This is the largest and I think the most successful gathering we have had," says Dr. Curson. "The bottom row is composed of Members of Council (except Mr. S. T. Amos) present at the meeting, their names from left to right being Dr. A. D. Thomas, Messrs. A. M. Diesel and C. J. van Heerden, Dr. P. J. du Toit, myself, Sir Arnold Theiler, Mr. S. T. Amos, Dr. P. J. Fourie and Mr. R. du Toit (Hon. Secretary-Treasurer)."

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Jan. 13th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4 p.m.

Jan. 16th.—Extraordinary General Meeting of the Central Division, N.V.M.A., at the Royal Veterinary College, 6.30 p.m.

Jan. 17th.—Annual Meeting of the Mid-West Division, N.V.M.A., at Bristol, 2.30 p.m.

Jan. 17th.—Meeting of the Southern Counties Division, N.V.M.A., at Winchester, 2.30 p.m.

Jan. 17th.—Ladies' Guild Dance in aid of the Victoria Veterinary Benevolent Fund, Princes' Galleries, Piccadilly, W.

Jan. 22nd.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, Loughborough, 2.30 p.m.

Jan. 25th.—Meeting of the Scottish Branch, N.V.M.A., at Perth.

Sept. 14th-18th.—N.V.M.A. Annual Congress, Scarborough.

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PERSONAL

Lady Hobday

Our readers will be relieved to learn that Lady Hobday's name has now been removed from the danger list of the hospital at which she has been lying since just before Christmas, when she was knocked down by a motor-car in Kensington. This happy report from the hospital is the more surprising in that X-ray examination, which, owing to Lady Hobday's critical condition, could not be made until Saturday last, disclosed a fracture at the base of the skull, and fractures at the shoulder, elbow and ankle.

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Births.—On January 5th, 1936, at 345, London Road, St. Leonards-on-Sea, Sussex, to Helene Druce Blount (*née* Slater), wife of W. P. Blount, F.R.C.V.S., twin daughters—one stillborn.

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R.C.V.S. OBITUARY

James, John Clark, Lion House, Castle Street, Thornbury, Glouc. Graduated London, April 20th, 1869. Fellow January 28th, 1887; died January 1st, 1936, aged 87 years.

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MILK VETERINARY SERVICES IN SOMERSET

Milk veterinary services in Somerset were the subject of a report presented at a recent meeting of the Somerset County Council, by the Diseases of Animals (Executive) Sub-Committee of the County Agricultural Committee and the Milk Special Committee.

It was stated that at a conference, the general lines of policy agreed upon were:—

(*a*) Generally to assist in extending the production of graded milk in this county; and

(*b*) To encourage all milk producers to clear their herds of tuberculosis.

In order that the policy might be carried into practical effect, the Council was recommended to carry out, through its whole-time and part-time veterinary staff, all veterinary examinations under the Milk (Special Designations) Order, payment for this service being made to the Council by the producers on certain scales set out in the report.

Other recommendations included the appointment of a whole-time assistant county veterinary officer at a commencing salary of £500, rising to £650.

A member stated that while he was not looking forward to further officials he felt the time had come when they must do something to improve their milk supply. The smaller counties had full veterinary services.

The Finance Committee recommended that this report dealing with milk and the veterinary service should be referred back to the Diseases of Animals Committee and Milk (Special) Committee for further consideration and report, with a direction to submit the report to the full Agricultural Committee.

The report was accordingly referred back.

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ASSOCIATION OF BRITISH ZOOLOGISTS

The annual meeting of the Association of British Zoologists was held in the rooms of the Zoological Society on Saturday, with Professor Julian Huxley in the chair. The association meets annually for discussion of subjects of general interest to zoologists in connection with the organisation of their science and its utilisation in the social life of the country.

The confusion caused by the frequent changes in the accepted scientific names, even of common animals, and the provision of some means of avoiding this confusion, was discussed. A list of the names at present accepted as correct for a large number of animals commonly used in schools and universities for teaching and experiment has been prepared by the council of the association, and it is hoped to publish this list shortly. By providing an authoritative list, frequently revised, it is hoped to cause many of the alternative names now used to fall into disuse.

The opportunities provided for the younger members of the staffs of the universities to carry on independent research was the subject of speeches by Professor J. W. Munro, of the Imperial College of Science, Dr. B. Dawes, Mr. C. C. Hentschell, Dr. E. B. Worthington, and others. At many universities promotion is made to depend largely on the research done by the member of the staff. It was the general view that for the teaching members of the staff there was not sufficient opportunity either in time or equipment in many university departments for carrying out any valuable research. It was suggested that an increase in the numbers of the staffs and provision of research grants, especially for the teaching members of the staff, would ease the position, which has become more difficult in the last 20 years, because of the increase of the number of students in the universities.

Consultant work in zoology was also discussed, and Dr. J. C. F. Fryer, Dr. R. C. Fisher, and Mr. H. R. Hewer were among the speakers. In recent years the work done by zoologists in solving problems for farmers, the building trades—in connection with pests of many kinds in houses—and for other com-

mercial bodies has greatly increased. In spite of the existence of institutions provided by the Government for the study of such problems, this work is now often done by the private zoologist. It was felt that some recognised list of consultant zoologists would be valuable, and the council of the association was instructed to arrange, if possible, for such a list.

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PRIME MINISTER ON MUZZLING

Mr. Baldwin sat on the Stourport (Worcs.) Bench on Saturday to make a presentation to Mr. Stanley Hemingway, who has retired from the office of magistrates' clerk, and recalled that he had appeared in the dock at that court during the time of the late Mr. Richard Hemingway, Mr. S. Hemingway's father.

"It was in the time when muzzling orders were about," Mr. Baldwin explained. "I had a dog of a very inquisitive turn of mind, and it walked out of the gate of the house to get the early morning air. Then it sat down on the grass verge to tear its muzzle off. Inspector Walker, passing by at the time, saw that it was 'insufficiently clad,' and it cost me 10s. (Laughter.)

"I often wish in this strange life which I pursue," added Mr. Baldwin, amid further laughter, "that muzzling orders were more common than they are."

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IN THE COURTS

Condemned Meat.—Thomas Henry Walter Nottage, a butcher, of Belle Grove Road, Welling, Kent, pleaded "Guilty" at Guildhall Justice Room on Thursday of last week, before Mr. Alderman Pollitzer, to a charge of causing a pig carcase to be sent to Smithfield Market which was afterwards seized and condemned as unfit for food. Mr. L. Ricketts, solicitor, defending, said that the whole matter arose from an accident. The pig was killed late in the day, and the carcase was left hanging up in the slaughterhouse with a note attached to it which read, "Not to be taken away." The reason for that, continued Mr. Ricketts, was that the defendant had not had the carcase passed by the local authority, and he would not have sent any carcase out which had not been passed. In the early hours of the morning the carriers called to collect meat for delivery in the market, and they removed the pig without seeing the attached note. The defendant was fined £20 and ordered to pay five guineas costs.

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Surprise Visit to Smithfield.—It was stated at Guildhall on December 31st that at 2 a.m. on October 20th the City Corporation veterinary surgeon paid a surprise visit to Smithfield and noticed a large quantity of beef in a motor-van *en route* to a firm of provision merchants to be made into sausages. Of this meat two forequarters and one hind-quarter were condemned and destroyed as unfit for human food. In consequence, William Charles Smith, of Station Road, Wootton Bassett, Wilts., was summoned for sending the beef, which weighed 72 lb. and William John Strong, of Marlborough Road, Wootton Bassett, was summoned as the owner of the meat. Both pleaded guilty. Smith was fined £40 and Strong £20, with 10 guineas costs. Smith was allowed a month in which to pay.

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Breach of Anthrax Order.—Under the Anthrax Order of 1928, a Staffordshire farmer has been fined £10, with 10 guineas costs, for having in his possession a diseased heifer without giving notice. He was also fined £10 for having a diseased carcase without giving notice.

CLEAN MILK SCHEMES: NEED FOR CO-ORDINATION

Disappointment has been expressed that the Prime Minister, in his reply (in the House prior to the Recess) to a question concerning the above, could not see his way, amid his other preoccupations, to promise that further consideration should be given to the co-ordination of the several "better milk" schemes. The Minister of Health is responsible for the certified and Grade A (T.T.) schemes, the Ministry of Agriculture for the attested scheme, and the Milk Marketing Board is chiefly interested in the Grade A scheme, the administration of which is in the hands of the county authorities that issue Grade A licences.

"There is undoubtedly a good deal of inter-departmental confusion," says *The Farmers' Weekly*, "and while the Prime Minister assured the House of Commons that there is 'full consultation between the Ministry of Health and the Ministry of Agriculture in matters affecting the quality of the milk supply,' the co-ordination of administration would simplify matters for producers and enable more rapid progress to be made in an agreed policy.

"It would help, too, if at the same time the Milk and Dairies Order were uniformly administered throughout the country. In Cheshire there are 1,924 Accredited Producers out of a total of 7,136 registered producers, while in the West Riding of Yorkshire only 320 producers are accredited out of a total of 9,597 registered. Are the cowhouses of Cheshire really so much better than those of Yorkshire?"

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ERGOMETRINE AND ERGOTOCIN

In March of last year *The Lancet* commented on the discovery by Dudley and Moir of ergometrine, a new active principle present in ergot, and referred also to ergotocin, a similar principle described by a group of workers from the University of Chicago. In the November 30th issue the question whether they are identical or different substances is considered, in the light of further observations now available. It is pointed out that the outstanding discrepancy is in the empirical formula, for Kharasch and Legault assign a formula of $C_{21}H_{27}O_3N_3$ to ergotocin and the late H. W. Dudley a formula of $C_{19}H_{23}O_2N_3$ to ergometrine; in other chemical respects the substances are extremely similar and they have identical melting points. Dudley concluded that "ergotocin is in all probability identical with ergometrine." Continuing, *The Lancet* says: "The pharmacological actions of ergotocin have recently been described by Davis, Adair, Chen and Swanson and those of ergometrine by Brown and Dale. Those actions investigated by both sets of observers, with the exception of the effect on the cock's comb, are similar in every respect. Ergometrine caused cyanosis of the comb but did not lead to gangrene in a course of injections which with ergotoxine produced extensive gangrene. Ergotocin, on the other hand, is said in this respect to be 'more potent gramme for gramme than ergotoxine.' With this single exception, which may well be accounted for by differences in the way in which the experiments were carried out, the similarity between the two principles extends to detail; for example, both have a pressor effect when given to a spinal cat, but a depressor effect in the intact anæsthetised cat. The pressor effect of ergometrine is shown to be much less than that of the ergotoxine group of alkaloids. It has only a trace of the specific paralysing action on motor effects characteristic of this group. The most important action, that on the

uterus, is also the most characteristic action of ergometrine. It is the only action produced by small doses and consists in 'the initiation of a long persistent rhythm of powerful contractions in a uterus normally quiescent as in the early puerperium.' Brown and Dale at each stage in their investigation compare their findings on ergometrine with those of the Chicago workers on ergotocin, and the similarity in action is very obvious. They also point out the extreme difficulty of demonstrating the activity of ergometrine when present in crude extracts of ergot, except by observations on the uterus of the human patient, and this explains why ergometrine escaped recognition by the methods of experimental pharmacology for so many years.

"The Chicago group of workers have just published a new study of ergotocin, in which they summarise their chemical and pharmacological results, and bring forward new clinical observations. If is unfortunate that they refer only in passing to the isolation of ergometrine, and that they do not compare their clinical findings with the original observations of Dudley and Moir. The action of ergotocin on the human puerperal uterus appears, however, to be identical with that of ergometrine as described by the British observers. The dose of ergometrine recommended by Dudley and Moir is larger than the dose of ergotocin used by the American workers who, however, state that their dose is minimal. The intravenous doses of ergotocin and ergometrine are in good agreement. Ergotocin is shown to have no detrimental effect on the blood pressure, pulse, or urinary output of patients. It has been given without ill-effect in the third stage of labour, and is stated to be more effective than any other known oxytocic drug. It is of special value in the treatment of *post-partum* hæmorrhage.

"The place of ergometrine in clinical practice has recently been described by Moir. He concludes that ergometrine is likely to prove a valuable alternative to pituitary extract in the treatment of *post-partum* hæmorrhage, and he thinks it is worth trying in third-stage hæmorrhage when simple methods have failed, especially if the uterus is relaxed.

"When all the evidence from chemical, pharmacological, and clinical sources is considered together, it is very difficult to believe that ergometrine and ergotocin are distinct substances. If they are indeed identical, the question arises of a single internationally recognised official name. The position is, however, complicated by the existence of two other substances each claiming to be the active principle of aqueous extract of ergot, but about which less information is available. Stoll and Burckhardt have described a substance with the same structural formula as ergometrine, extracted from ergot in a similar way and with similar chemical properties. This they have called ergobasine. Its pharmacological actions as described by Rothlin are essentially those of ergometrine, and it is almost certainly the same substance. It is less easy to place Thompson's ergostetrine ('alkaloid X') as relatively few details of its chemical and pharmacological properties are given. It is, however, a similar principle although its toxicity in animals appears to be greater than that of ergometrine.

"The isolation from ergot by Smith and Timmis of a substance isomeric with ergometrine may help to explain some of these discordant results. This substance, ergometrinine, is said to bear the same relationship to ergometrine as ergotoxinine does to ergotoxine. Its pharmacological properties have not yet been investigated and it probably will prove to be relatively inert, but its admixture with the pure principle may well account for minor discrepancies in the findings of different investigators.

"The state of affairs with regard to these substances is very unsatisfactory, and there is a real danger that, as they become more widely used, the confusion in nomenclature may spread to the clinical field. The general position has been admirably summed up by Dale. It can hardly be disputed that Moir's observations published in 1932 afforded the original impetus to work in this field. As a direct outcome, Dudley and Moir isolated a new active principle and gave the first full and clear account of its chemical characteristics and clinical effects. Subsequent events have shown that this active principle, now well defined and fully investigated pharmacologically, is almost certainly the same as that to which other observers have given different names. Ergometrine would certainly appear, therefore, to have the strongest claims to official international recognition as the name for that active principle upon which the therapeutic action of ergot mainly depends."

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MANDELIC ACID IN THE TREATMENT OF URINARY INFECTIONS

The following conclusion of Drs. D. M. Lyon and D. M. Dunlop of Edinburgh is recorded in the *British Medical Journal* of December 7th: "The treatment of severe chronic urinary infections has hitherto been notoriously unsuccessful in spite of the large number of antiseptics available. The very multiplicity of such preparations on the market, indeed, speaks for their inefficacy. Our results would seem to suggest that in mandelic acid a really efficient urinary antiseptic has been found, confirming the original claims made for the drug by Rosenheim. If this is so, this simple and practical treatment forms a really important therapeutic advance in the attack on a very common and disabling condition."

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RABIES AND BATS IN TRINIDAD

The British Medical Journal of December 21st, 1935, contains the following summary of an account, given by Dr. Eric de Verteuil and Professor Urich at a meeting of the Royal Society of Medicine and Hygiene on November 21st, of paralytic rabies, with particular reference to its occurrence in Trinidad and its transmission by bats.

In 1906 a disease of a paralytic type broke out in epizoötic form among cattle and other stock in Santa Catarina, Brazil. Since then it has persisted there in sporadic form. In 1921 Haupt and Rehaag, after having caught a bat in the act of biting a cow in the daytime, proved that the disease was actually rabies transmitted by the bats which harboured Negri bodies. Destruction of dogs was not followed by any diminution in the number of cattle affected. It was noted that the disease occurred most commonly where the vampire bats were most numerous; a river impassable to dogs afforded no hindrance to the spread of the infection. In 1931 and 1934 severe epizoötics broke out among cattle in the State of Matto Grosso as well as in the original focus of Santa Catarina. On this occasion it was conclusively proved that the vampire bat, *Desmodus rotundus*, was the vector. No attempt appeared to have been made to control the bats, owing probably to their very wide distribution, but wholesale antirabic vaccination (*virus fixé*) was said to have conferred immunity on the cattle. The symptoms of the disease were similar to those exhibited by any herbivorous animal bitten

by a rabid dog. In 1925 a disease causing 60 deaths broke out among cattle near Port-of-Spain, the capital of Trinidad. In subsequent years it spread to other parts of the island, and was now considered to have been responsible for the death of several thousand animals. The disease, which had a mortality rate of 100 per cent., was regarded at first as a form of botulism till 1929, when there were 13 fatal human cases of what was thought to be acute anterior poliomyelitis. There were three further cases in 1930 and one in 1931. A study of *post-mortem* material by Pawan in Trinidad and Hurst at the Lister Institute revealed the true nature of the condition, which was no other than paralytic rabies in man. About this time Pawan demonstrated Negri bodies in a number of fruit-eating and vampire bats captured in the daytime while attempting to bite animals or each other. It thus became clear that the paralytic disease of cattle and human beings was no other than rabies transmitted by vampire bats. Since 1931 further human cases had occurred, bringing the total to 55, so that it had become evident that in Trinidad, and probably also in many parts of the South American continent where human cases had not yet been reported, the vampire bat was a danger to domestic stock and also to human beings by virtue of its power to convey rabic infection to its victims. It was interesting to note that in Panama the vampire bat had been incriminated as the vector of another disease. Horses suffered from a fatal form of trypanosomiasis, which they might acquire through the bites of infected bats, which in their turn had obtained the infection from cattle which acted as carriers of the trypanosome in question. The demonstration that the blood-feeding bat was a grave source of danger, quite apart from the wounds it inflicted, had led to an intensive investigation of the bats of Trinidad, with a view to the elaboration of methods for exterminating them. It was soon found that there was only one blood-feeding bat, the true vampire *Desmodus rufus*, and it became possible to confirm the observations of Dunn, made in Panama in 1932, that the old legend that the bat hovered over its victim, which was fanned to deep sleep by the movement of the wings while the bat sucked its blood, was a myth. Dunn showed that the bat always alighted, crawled to a suitable spot and, as a kitten lapped milk from a saucer, lapped the blood which flowed from the wound inflicted by its upper incisors. The vampire bat, although it could transmit rabies to other bats by biting, was itself the only transmitter to man and to domestic animals, a fact which simplified considerably the problem of combating the disease. Another favourable feature was its relatively slow rate of multiplication. The period of gestation was not less than three months, and only one young was produced at a time. The feeding habits of the bat were such that after a full meal of blood it was so distended that it was unable to fly far from its feeding place. Accordingly, it sought a digesting place, some near-by disused tunnel or deserted building, where it could remain undisturbed for some hours until the relief of tension allowed it to fly to its regular sleeping place, which might be a mile or two away. It returned night after night to the same feeding and digesting places, so that when these had been located it became possible to destroy the bats. The regular sleeping places were frequently caves and hollow trees, which could be recognised by the characteristic dropping on the ground below the spot where the bats were lodged. As many as 162 vampire bats had been captured in one cave, and 117 in one tree. The bats were wholly nocturnal, but it had been noted that rabic bats might suffer from a form of excitement which led them to fly and bite during the daytime. They transmitted infection not only to man and cattle but also to their own kind, and even to other species of bat. These last, however, not being blood feeders, did not constitute a danger in themselves, although transmission from bat to bat of any kind might occur during fights. Various methods of bat destruction had been tried. The most effective method was to discover the sleeping place, and to capture the bats in nets or shoot them. Poisoning by "cyanogas A dust" had also given good results. Use had also been made of the bat's habit of returning each night to the same wound on the same animal. The application to the wound of a paste containing strychnine had resulted in the death of many bats.

General Discussion

Professor J. C. G. Ledingham referred to the investigations by Dr. Hurst and his co-workers at the Lister Institute with material received from Trinidad. This had been supposed to be from fatal cases of some kind of poliomyelitis or ascending myelitis, and it was a surprise when sections of the brain of the first monkey which had succumbed to intracerebral inoculation revealed Negri bodies. This discovery necessitated the antirabic vaccination of a laboratory assistant who had been bitten a short time before this by the monkey. Professor Ledingham thought that the discovery of rabies in the bat raised the whole question as to the ultimate reservoir of the rabic virus: was it actually the bat, or was it some carnivore? Dr. Hurst said that one of the most important points brought out in the paper was that, from investigations which had been made in Brazil, it appeared that the bat might enter into a latent phase of rabic infection during which the saliva remained infective for months without there being any indication of nervous disease. This phenomenon had not been noted in any other animal, and, if confirmed, represented a discovery of great importance. Dr. Lindsay referred to an outbreak of a paralytic disease of cattle which had occurred in Paraguay during his residence there. It was regarded as a bovine form of *mal de caderas*, a term usually applied to a trypanosomiasis of horses. The disease attacked cattle, sheep, pigs and even cats. The true nature of the disease had been disclosed by the discovery of Negri bodies in the brains of cattle and bats. The epidemic of 1928-31 was preceded by an epidemic of rabies among dogs which almost exterminated these animals in many parts of the country. The canine disease again appeared in epidemic form in 1931, when the cattle epidemic was subsiding. During this time there were very few cases of rabies among human beings. Since the subsidence of the epidemic, at the height of which cattle traders were losing 25 to 30 per cent. of their stock, the disease had remained in the country in sporadic form.

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HOW SURGICAL MAGGOTS ACT

"Baer's observation some years ago that the implantation of blow-fly larvæ in osteomyelitis wounds encourages healing has led to their extended use, at least in the United States. It has been supposed hitherto that their principal action consists in removing necrotic tissue, and known that their presence reduces the bacterial population, but attempts have lately been made to inquire further into the nature of the effects

they produce, if only for the reason that an extract of maggots, if equally serviceable, would be æsthetically more acceptable. Several explanations, not mutually exclusive but scarcely likely to be all equally true or important, are advanced in recent papers. Messer and McLennan[1] have determined the *p*H of exudates in wounds treated with maggots, and observed usually an alkaline reaction attributable to the formation of ammonia by the maggots; this they credit with discouraging bacterial growth, but since the maximum degree of alkalinity observed was only *p*H 7·86, a fairly comfortable environment for most bacteria, the suggestion is not wholly convincing. They have also shown experimentally that the maggots excrete a proteolytic enzyme; the assimilation of products liberated by its action which would otherwise have to be absorbed is doubtless a favourable factor. Robinson[2] states that the excreta of maggots contain allantoin, a substance which stimulates cell proliferation. Evidently maggot excrement, strange as this may seem, plays an important part in the beneficial work, since S. W. Simmons[3] claims to have shown that this material is strongly bactericidal. It has previously been observed that the lower gut of maggots and of certain insects, unlike that of higher animals, is sterile. Simmons devised a method of collecting a suspension of maggot excrement in sufficient bulk for experimental purposes, and found it to be capable of destroying staphylococci, streptococci, and several other types of bacteria in short periods of time and in what in terms of solid excrement appears to represent considerable dilution. This bactericidal activity was unimpaired by autoclaving and can consequently have nothing to do with the presence of bacteriophage. It is peculiarly unfortunate that no observations are recorded of the reaction of this material, since it is consequently impossible to compare these findings with the hypothesis of Messer and McLennan. That ammonia is the active principle seems unlikely in view of the fact that filtration apparently destroys bactericidal activity, which is thus bound up in some way with the solid particles in the material. Simmons's anticipation that here is a fertile field for harvesting new disinfectants possibly superior to those of non-living origin is perhaps unduly sanguine; one would like to know a little more about the physical and chemical properties of this one before assuming that there may be others, or that they possess virtues hitherto unavailable. Nevertheless, the idea of using excrement as an antiseptic is so novel, not to say fantastic, that it must command interest and good wishes to anyone who out of the strangest and most repulsive therapeutic innovation of recent times has been able to extract an idea which is stranger still."—*Brit. Med. J.*, December 7th, 1935.

[1]*Journ. Lab. and Clin. Med.*, 1935, xx, 1219.
[2]*Journ. Bone and Joint Surg.*, 1935, xvii, 267.
[3]*Journ. of Bact.*, 1935, xxx, 253.

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ANIMAL INTELLIGENCE

Discoursing on the above subject to young people at the Royal Society of Arts, Dr. David Katz (formerly Professor of Psychology and Education, and Director of the Psychological Laboratory, University of Rostock, Mecklenburg) made reference to the complicated nature of the difference between the intelligence of man and animal, observing that the intelligence of the latter was shown by the way in which it coped with a new situation. After close study scientists had come to the conclusion that three different types of intelligent behaviour existed in animals. The first was behaviour due to instinct. Although instinct was generally regarded as the lowest kind of intelligence, it was instinct which for thousands of years had so puzzled all who had studied animal behaviour. The second type of intelligent behaviour was met with in animals which were able to learn from experience. The third and highest type was that in which an animal made use of a sort of reasoning power. Whereas a great number of insects, birds and mammals were able to learn from their experiences, there were only a few, such as the gorillas, chimpanzees, and orang-outangs, which had climbed the ladder of evolution up to the point at which reason and insight came into play.

Dr. Katz concluded by saying that it was likely that animals had sense-organs by which they could perecive things to which our own organs did not react. Experiments led to the conclusion that bees had such striking powers of knowing the time that they might well be called living watches.

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FAUNA OF THE EMPIRE

The Society for the Preservation of the Fauna of the Empire, with the approval of the Secretary of State for the Colonies, has asked Sir Thomas Comyn-Platt and Captain Keith Caldwell to visit (1) Ceylon and Malaya, and (2) the West Indies, British Guiana, and British Honduras, to report on the preservation of the fauna of those countries, with special reference to the danger of extinction to any rare species.

The two missions will be conducted on lines generally similar to those undertaken by Major Hingston to East Africa in 1930, and by Colonel Haywood to West Africa in 1931-32, both of which were made on behalf of the society.

Sir Thomas Comyn-Platt and Captain Caldwell will leave England early in the year, and will report direct to the society.

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HORSES IN AMERICA: AN ENCOURAGING OUTLOOK

We are glad to learn that much optimism in regard to the future of the horse in America prevailed at the highly-successful Sixteenth Annual Meeting of the Horse and Mule Association of America which was held on December 4th, 1935, at Chicago, and which was well attended by members from all parts of the United States. President A. B. Hancock of Kentucky, in his opening address emphasised the prosperous condition of the horse and mule industry, which is enjoying prices from 25 to 40 per cent. higher than those of two years ago, with a broad demand for all available animals. He stated that pleasure horse use was increasing and that racing was making an enormous growth.

Secretary Wayne Dinsmore reviewed the work done by the Association during the past year and pointed out that the forecasts made by the association were being borne out by present supply, demand and prices.

Treasurer H. A. Bascom of Boston, Massachusetts, presented the financial report, which disclosed that the income of the association was 25 per cent. greater in 1935 than in the preceding year and that membership gain was greater than at any time since 1930.

Amongst the lecturers on the occasion of this meeting were Dr. E. H. Barger of Illinois and Dr. John R. Mohler, Chief of the Bureau of Animal Husbandry, U.S. Dept. of Agriculture, Washington, D.C. Their addresses, on diseases of the brain and nervous system in horses, were

illustrated by motion pictures and were of deep interest to the breeders present, who are vitally concerned with research work now being pursued to stamp out these affections.

Secretary Dinsmore made a progress report on "Overcoming Impotency and Sterility in Stallions and Jacks," which dealt briefly with tests of vitamins, hormones and other factors in restoring breeding power to sires.

"Horse Power in Action," described as an extremely informative and interesting motion picture with sound accompaniment—a "talkie"—appears to have "made a hit." It is a short feature film just completed by the Horse and Mule Association of America, is designed to fill in on any theatre programme, and those who saw it predict that every school of vocational agriculture and every meeting of horse and mule breeders will want to obtain it for exhibition in their local theatres.

It was announced that the Association will continue a vigorous advertising campaign in the press and over the radio during the ensuing year.

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SODIUM SULPHATE TREATMENT OF WOUNDS

In the course of the recent lecture on "To-day's Uses for Yesterday's Drugs," Dr. J. C. Lyth stated that he had for eight or nine years almost banished ordinary antiseptics from his surgery in favour of the use of sodium sulphate, which, in a 12 per cent. solution, he finds to possess great efficacy in the treatment of all wounds not made under conditions of surgical asepsis. Plain lint is soaked in the solution and applied to the surface of any ordinary fairly open septic wound. The lint, which is kept suitably covered, is changed according to the amount of discharge, but must be kept soaked with the solution. For fairly clean or very superficial wounds, one application of a gauze dressing soaked in the solution and allowed to dry is often effective. Two cases in which the wounds were deep, dirty and septic were described in detail and for which the only external treatment used was the application of the hypertonic sodium sulphate solution and no attempt was made to remove any of the entangled dirt: but in both cases the healing was rapid and clean.

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Farmers in the Gretna district, assisted by the police, are fighting the most serious epidemic of sheep worrying that has occurred on the Border in recent years.

Correspondence

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

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POLL-EVIL AND FISTULOUS WITHERS

To the Editor of The Veterinary Record

Sir,—Mr. Steward and others, believing in the midge-borne parasitic origin of these conditions, may be interested to learn that a treatment in common use in the U.S.A. consists in the oral administration of powders containing willow bark. One such preparation is "Salix," said to be:—

℞Arsenic 3 per cent.
Iodised meal 11½ per cent.
Sulphur 1 per cent.
Fortified willow bark 80 per cent.

It is said that horses pastured among willow trees there, do not become affected.

Yours faithfully,

Geo. H. Jelbart.

Rock Hill,
Brackley.
January 6th, 1936.

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16th to 31st Dec., 1935	24	26	6	657	3	4	41	83	39
Corresponding period in									
1934	24	34	4	396	3	7	45	106	50
1933	19	21	—	—	4	9	53	48	11
1932	17	22	7	1,237	6	18	54	43	24
Total 1st January to 31st Dec., 1935	386	443	56	12,444	99	222	475	2,048	1,219
Corresponding period in									
1934	395	453	79	10,302	115	191	684	1,833	1,031
1933	297	345	87	7,805	132	225	578	1,414	901
1932	344	418	25	2,659	127	204	361	1,555	757

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.